

AMENDMENTS TO THE DRAWINGS/FIGURES

The attached drawing page includes a change to Fig. 3 on Page 3/4. Replacement Page 3/4 which includes changes to Fig. 3 replaces original Page 3/34. An Annotated page showing the change is also attached.

Attachments: Replacement Page 3/4 and Annotated Page 3/4 showing changes.

REMARKS

The applicant appreciates the Examiner's thorough examination of the application and requests reexamination and reconsideration of the application in view of the preceding amendments and the following remarks.

THE OBJECTIONS TO THE DRAWINGS

The Examiner objects to the drawings because reference character "115" has been used to designate two different structures, and requires corrected drawing sheets. The Examiner also objects to the drawings because they do not include reference numeral "118".

In response, the applicant has amended Fig. 3 to change the lattermost reference numeral "115" to "118" as set forth, for example, on page 16, lines 2-6.

Accordingly, the applicant respectfully requests that the Examiner withdraw the objections to the drawings.

THE 35 U.S.C. §102(b) REJECTIONS BASED ON *MARSH*, *SCHNEIDER* AND *DUEL*

The Examiner rejects claims 1, 5, 6, 9-11, 16, 17, 19, 20, 22, 24, 38, 41, 42, 44, 46-49, 51 and 52 under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 4,649,704 to *Marsh*. The Examiner also rejects claims 1, 5, 6, 9-13, 16, 17, 19, 20, 22, 24, 38, 41, 42, 44, 46-49, 51 and 52 under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 3,918,498 to *Schneider*. The Examiner further rejects claims 1, 5, 6, 9-13, 16, 17, 19, 20, 22, 24, 38, 41, 42, 44, 46-49, 51 and 52 under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 6,418,970 to *Deul*.

The applicant submits that neither *Marsh*, *Schneider* nor *Deul* disclose hermetic

sealing devices as claimed by the applicant in independent claims 1 and 38 to prevent leakage, but instead disclose either additional devices to account for known leakage, or disclose conventional seals which do not provide for a hermetically sealed pressure balanced accumulator.

The applicant recognized the adverse effects of leakage in accumulators, and in sharp contrast to a system like the system disclosed by *Marsh* where additional devices are included to mitigate the effects of leakage in the system, the applicant improved on such leaking systems by including hermetic sealing devices for sealing respective chambers, as discussed in the application and as claimed. One particular hermetic sealing device is a welded metal bellows, as disclosed in the applicant's specification and as claimed by the applicant in dependent claims, one of which was restricted by the Examiner and withdrawn (claim 8) and others which were added and have been rejected (claims 53 and 56). New claims 57 and 58 also include this feature.

Also in contrast to systems like the systems disclosed by *Schneider* and *Duel* (and other such systems), the applicant's claimed invention offers a vastly improved system which prevents leakage between accumulator chambers over time. In this way, system breakdowns may be avoided, as well as costly repairs, lost production time, and/or frequent system maintenance. See e.g. the applicant's specification at page 5, lines 5-22.

The 35 U.S.C. §102(b) Rejection Based On *Marsh*

With respect to *Marsh*, the Examiner states in pertinent part that:

...a movable divider 15 formed as a pin connecting two pistons 16, 17 which form hermetic seals via seals provided in grooves in the pistons to create four chambers ...

The applicant submits that *Marsh* does not disclose hermetic sealing devices as claimed by the applicant in independent claims 1 and 38, because *Marsh* discloses that there will be leakage in the system, in spite of *Marsh*'s seal 48 for example.

In sharp contrast to the applicant's claimed hermetic sealing devices to prevent leakage, *Marsh* discloses the addition of specific devices in the system to lessen the adverse effects of known leakage, or simply accepts some known leakage if it is less than "substantial".

Marsh discloses that seal 48 "prevents substantial leakage between the first cylinder means 11 and the second cylinder means 12" (with emphasis added). See e.g. *Marsh* column 3, lines 47-51. *Marsh* then discloses specific added structures to take leakage into account, such as a valve 36, and evacuation pump 34 to remove liquid which moves past the pistons 16 and 17 and into chamber 44. *Marsh* includes evacuation pump 34 which may periodically or continuously remove any fluid from the second pressure chamber 44 when actuated, in order to facilitate effective operation of the accumulator despite slight leakage of fluid past the pistons 16, 17 over long periods. A valve 36 may be used to manually drain at the surface any fluid prior to activation of the evacuation pump 34. *Marsh* further discloses that unless substantial leakage occurs this near vacuum may be maintained without continued operation of the evacuation pump 34, but that operation of pump 34 will aid in the removal of any substantial leakage of water 42 around the outside diameter of the second moveable piston 17. See *Marsh* column 4, lines 22-31 and column 6, lines 19-33 (with emphasis added).

It is clear that *Marsh* does not disclose each and every element of the applicant's independent claims 1 and 38, namely the applicant's claimed hermetic sealing devices.

Accordingly, the applicant submits that independent claims 1 and 38 are in condition for allowance over *Marsh*. Claims 5, 6, 9-11, 16, 17, 19, 20, 22, and 24 depend directly or indirectly from claim 1. Claims 41, 42, 44, 46-49, 51 and 52 depend directly or indirectly from claim 38. Accordingly, claims 5, 6, 9-11, 16, 17, 19, 20, 22, 24, 41, 42, 44, 46-49, 51 and 52 are also in condition for allowance over *Marsh* for at least the reasons above.

The 35 U.S.C. §102(b) Rejections Based On *Schneider* Or *Duel*

In contrast to the applicant's claimed invention, neither *Schneider* nor *Duel* disclose, among other things, a hermetic sealing device for sealing chambers from one another.

Schneider discloses only that there are "seals between each of the above described elements [e.g. pistons, rod] and the cylinder 2 or partition 11 maintain the fluid integrity of each of the volumes formed by the elements of the device." See *Schneider* at column 2, lines 5-8. To the best of the applicant's knowledge as one skilled in the art, the seals disclosed by *Schneider* – which was filed and issued over twenty years ago – were not hermetic seals nor were such seals achieved by hermetic sealing devices as claimed by the applicant.

Duel discloses that lip seals may be seated in the grooves in the cylinder block and/or pistons. To the best of the applicant's knowledge as one skilled in the art, lip seals provide "sealing" by a wiping or scraping action at a surface, and do not provide a hermetic seal as claimed.

It is therefore clear that neither *Schneider* nor *Duel* disclose each and every element of the applicant's independent claims 1 and 38. Accordingly, the applicant submits that independent claims 1 and 38 are in condition for allowance over *Schneider* and *Duel*. Claims 5, 6, 9-13, 16, 17, 19, 20, 22, and 24 depend directly or indirectly from claim 1. Claims 41,

42, 44, 46-49, 51 and 52 depend directly or indirectly from claim 38. Accordingly, claims 5, 6, 9-13, 16, 17, 19, 20, 22, 24, 41, 42, 44, 46-49, 51 and 52 are also in condition for allowance over *Schneider* and *Duel* for at least the reasons above.

THE 35 U.S.C. §103(a) REJECTIONS BASED ON
MARSH, SCHNEIDER OR DUEL IN VIEW OF THOMPSON ET AL.

The Examiner rejects claims 2, 7, 26, 39, 40 and 53-56 under 35 U.S.C. §103(a) as being unpatentable over *Marsh*, *Schneider*, or *Duel* in view of U.S. Pat. No. 6,412,476 to *Thompson et al.*, stating in pertinent part that the primary cited references disclose the applicant's claimed structure "with the exception of providing bellows structure to the pistons".

Thompson et al. does not teach the hermetic sealing device as claimed by the applicant, and thus even in combination with the primary cited references, *Thompson et al.* fails to teach each and every element of the applicant's claimed invention.

Thompson et al. teaches collapsible bellows members or diaphragms 26, 28 "made from a durable corrosion-resistant material such as a polymer or nylon material" in the "preferred embodiment". See *Thompson et al.* at column 3, lines 39-41. Such materials would degrade over time, and would not create a hermetic seal as claimed by the applicant.

Thompson et al. also teaches that "diaphragms 26, 28 may be other types of selectively expandable diaphragms". See *Thompson et al.* at column 3, lines 42-44. It is clear, however, that according to *Thompson et al.* the primary advantage of the expandable diaphragms is the "drag-reducing" benefit over conventional "tight 'drag-producing' seals", and the resulting relatively easy movement of the piston without a significant amount of drag. See *Thompson et al.* at column 4, lines 50-61. This stated advantage as taught by

Thompson et al., together with the fact that *Thompson et al.* teaches polymer or nylon material as the preferred material, makes it clear that “other types of selectively expandable diaphragms” are would not include hermetic sealing devices, in contrast to the applicant’s claimed invention.

Additionally, rejected dependent claims 53 and 56 include the recitation that the claimed bellows devices are welded metal bellows. None of the cited references disclose or teach welded metal bellows as claimed by the applicant. New claims 57 and 58 also recite this feature.

Finally, claims 2, 7 and 53-56 depend directly or indirectly from independent claim 1, claims 39 and 40 depend directly from independent claim 38, and claim 26 recites bellows devices for hermetically sealing chambers one from another, in similar manner to claims 1 and 38 discussed above. Accordingly, claims 2, 7, 26 and 53-56 are also in condition for allowance for at least the same reasons as discussed above.

THE 35 U.S.C. §103(a) REJECTIONS BASED ON *SCHNEIDER* OR *DUEL*

The Examiner rejects claims 14, 18, 21, 43, 45 and 50 under 35 U.S.C. 103(a) as being unpatentable over *Schneider* or *Duel*.

Claims 14, 18, and 21 ultimately depend from independent claim 1, and claims 43, 45 and 50 ultimately depend from independent claim 38. Independent claims 1 and 38 are in condition for allowance for at least the reasons above. Accordingly, claims 14, 18, 21, 43, 45 and 50 are also in condition for allowance for at least the same reasons.

CONCLUSION

Each of Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that claims 1, 2, 5-7, 9-14, 16-22, 24, 26, and 38-56, as well as new claims 57 and 58, are in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'RJC', written over a horizontal line.

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Applicant: Andrew J. White
Title: HERMETICALLY SEALED PRESSURE
BALANCED ACCUMULATOR
Serial No.: 10760,334.
Docket No.: PKI-291J
Attorney: Iandiorio & Teska

ANNOTATED PAGE 3/4 SHOWING CHANGES

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